

What is claimed is:

Sub
a1

1. A method for encoding data, comprising:

identifying at least a first dominant error for a communication channel;

determining a range of user values corresponding to a maximum tolerable user value error;

assigning a first user value to a first code word; and

assigning a second user value to a second code word, wherein said second user value is within said range of user values from said first user value, wherein a word encoded as said first code word is read as said second code word if said at least a first dominant error occurs.

2. The method of Claim 1, further comprising assigning a third user value to a third code word, wherein said third code word is outside of said range of user values from said first user value, and wherein a word encoded as said first code word is not read as said third code word if said at least a first dominant error occurs.

3. The method of Claim 1, further comprising:

identifying at least a second dominant error for said communication channel; and

assigning at least a third user value to a third code word, wherein said third user value is within said range of values from said first code word, wherein a word encoded as said first code word is read as said third code word if said at least a second dominant error occurs.

Sub
a)

4. The method of Claim 3, further comprising excluding as a valid user value at least a fourth code word, wherein a number of words that are read as said fourth code word following an occurrence of a dominant error is greater than two times said range of user values.

5. The method of Claim 1, further comprising assigning a plurality of user values to a single code word, wherein each of said plurality of user values is within said range of user values from any other of said other plurality of user values.

6. The method of Claim 1, wherein said code words are expressed as m-ary code.

7. The method of Claim 1, wherein said at least a first dominant error can occur within a code word and between a boundary of code words transmitted through said communications channel in series.

8. The method of Claim 1, wherein said at least a first dominant error is an error that is more likely to occur than any other error.

9. The method of Claim 1, wherein said at least a first dominant error is an error with the high probability of occurrence, and wherein all non-dominant errors are

significantly less likely to occur.

10. The method of Claim 3, wherein said at least a first and said at least a second dominant errors are equally likely to occur.

11. The method of Claim 1, wherein said communications channel comprises a channel of a computer disk drive.

11/03/2003 10:00 AM

See
a)

12. A method for developing an error minimizing code for use in connection with a system having a communications channel, comprising:

determining at least a first dominant error event for said system;

determining a maximum tolerable deviation between a user value as submitted for transmission at a first end of said communications channel and a user value as received at a second end of said communications channel;

identifying at least a first code word from a set of code words used in connection with said system that is susceptible to said at least a first dominant error;

assigning said code words to at least a first group of interdependent code words;

assigning a first set of user values to said at least a first group of interdependent code words, wherein adjacent interdependent code words are assigned user values that are within said maximum tolerable deviation from one another.

13. The method of Claim 12, further comprising determining a second dominant error event for said system.

14. The method of Claim 12, further comprising assigning a second set of user values to a second set of code words, wherein adjacent interdependent code words are assigned user values that are within said maximum tolerable deviation from one another, wherein a maximum difference between user values within said first set of user values is a first amount, wherein a maximum difference between user values within said second set of user values is a second amount, wherein said first amount is less than said second

Sub
a1

amount, and wherein any one individual user value of said first set of user values is less than any one individual user value of said second set of user values.

15. The method of Claim 12, further comprising excluding as a valid user value at least a third code word, wherein a number of code words that are read as said third code word following an occurrence of a dominant error event is greater than two times said maximum tolerable deviation between a user value as transmitted and a user value as received.

16. The method of Claim 12, further comprising assigning a plurality of user values to a single code word, wherein each of said plurality of user values is within said range of user values from any other of said plurality of user values.

17. The method of Claim 12, wherein said system having a communications channel can tolerate a difference between a user value as transmitted and a user value as received.

18. The method of Claim 12, wherein said first code word is written to an embedded runout correction field of a computer hard disk drive and is transmitted across a channel of said computer hard disk drive, and wherein said second code word is received by a detector of said hard disk drive due to an occurrence of said at least a first dominant error.

Sub
(a)

19. An apparatus having data encoded according to an error minimizing scheme, comprising:

a channel, wherein encoded data is transmitted across said channel, and wherein said channel is subject to at least a first dominant transmission error;

a decoder, wherein a first code word is read as a second code word upon an occurrence of said at least a first dominant transmission error, wherein said first code word has a user value that is within a range of a user values of said second code word, wherein said range of user values is determined by an amount of tolerable error.

20. The apparatus of Claim 19, wherein a first code word is read as a third code word upon an occurrence of said at least a second dominant transmission error, wherein said first code word has a user value that is within said range of user values from said third code word, wherein said range of user values is determined by said amount of tolerable error.

21. The apparatus of Claim 19, wherein the occurrence of said at least a first dominant transmission error does not result in said first code word being read as any other code word that is outside of said range of user values.

22. The apparatus of Claim 19, wherein said encoded data comprises binary code.

Sub
a)

23. The apparatus of Claim 19, wherein said at least a first dominant error is an error with a high probability of occurrence, and wherein all non-dominant errors are significantly less likely to occur.

24. The apparatus of Claim 20, wherein said at least a first and said at least a second dominant errors are equally likely to occur.

FOOTNOTES